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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,771	01/14/2004	Kunikazu Kuchino	KUCH3002/EM	2338

23364 7590 05/12/2010

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EXAMINER	
KITOV, ZEEV V	

ART UNIT	PAPER NUMBER
2836	

MAIL DATE	DELIVERY MODE
05/12/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/756,771	KUCHINO ET AL.	
	Examiner	Art Unit	
	ZEEV KITOV	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 3, 11, 14 - 20, 23 - 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 3, 11, 14 - 20, 23 - 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Examiner acknowledges a submission of the amendment and arguments filed on March 10, 2010. Claim 25 is amended. A new Office Action follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 11, 14 – 18, 23, and 25 - 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuji (US 6,159,421) in view of Hirano (US 6,774,561). Regarding Claim 1, Fuji discloses following: a photoelectron generating plate comprising a photoelectron emission layer (45 in Fig. 23) on a substrate (43 in Fig. 23) for emitting photoelectrons by an illumination of a light by a lamp (1 in Fig. 4) and inherently having a barrier property. It is well known in the art and supported by the evidence from on-line Encyclopedia Answers.com as follows: "When a metallic surface is exposed to electromagnetic radiation above a threshold frequency (which is specific to the surface of the material), the photons are absorbed and current is produced. No electrons are emitted for radiation with a frequency below that of the threshold because the electrons are

unable to gain sufficient energy to overcome the electrostatic barrier presented by the termination of the crystalline surface (the material's work function). By the law of conservation of energy, the electron absorbs the energy of the photon and if sufficient, the electron can escape the material with a finite kinetic energy".

Fuji further discloses the photoelectron emission layer being made of a ceramic material such as titanium carbide (col. 19, lines 1 – 21).

However, Fuji does not disclose a thickness of the photoelectron layer being greater than a maximum surface roughness of the underlying layer. Hirano discloses a light emitting device having a light emitting layer (6c in Fig. 1D) having a thickness of 50 nm and positioned on the top of a hole transporting layer (6b in Fig. 1C) having a thickness of 20 nm. It is clear therefore, that since the light emitting layer has a thickness of about two and half times larger than the underlying layer, the light emitting layer itself is thicker than the maximum surface roughness or unevenness of the underlying layer. Hirano reference represents an art analogous to the Fuji because (1) both inventions belong to the area of optoelectronics, (2) both structures include an upper layer generating an emitting factor either light or photoelectrons and (3) both are concerned with maximizing emitting ability of thin film emitting surfaces. Accordingly the same considerations regarding maximizing the emitting factors are applicable.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Fuji device, by a way of analogy with teachings of Hirano, by setting a thickness of its photoelectron emitting layer larger than the roughness of the underlying layer, by a way of analogy with teachings of Hirano,

since otherwise the photoelectron emitting layer would have too rough and non-contiguous surface, which would eventually reduce its active emitting surface area thus substantially reducing its ability to efficiently emit the photoelectrons; it is well known in the art, that an ability of any emission layer to emit either light or electrons from its surface directly depends on the area of an emitting surface, i.e. the larger surface the stronger emission.

Regarding Claim 11, Fuji discloses the device having the photoelectron generating plate (45 in Fig. 23) and a light source for emitting the light (1 in Fig. 23).

Regarding Claims 16 - 18, Fuji et al. discloses the photoelectron emitter layer, i.e. the barrier layer made of carbide of Ti (col. 19, lines 1- 21), which as well known in the art, is a conductive material.

Regarding Claim 23, Fuji discloses a light source (1 in Fig. 23) for illuminating a light on the photoelectron emission layer (45 in Fig. 23) of the photoelectron generating plate.

Regarding Claims 14 and 24, Fuji discloses the cleaning system wherein the air flow (6 – 2 in Fig. 23 and Fig. 30), while as well known in the art, the air has a substantial content of the oxygen.

Regarding Claim 25, Fuji discloses a mesh-shaped photoelectron generating member. According to Fiji (col. 20, lines 13 – 39), the photoelectron emitter may be provided in various forms including a metal mesh. It further discloses the electron emitter (45 in Fig. 23) and electrode (51 in Fig. 23) having opposite electrical potentials. It further discloses the photoelectron generating

member (photoelectron emitter) being installed in the vessel so that the air flowing in the vessel impinges onto the photoelectron generating member (shown in Fig. 14). According to Fuji (col. 20, lines 40 - 47), the strength of electric field may be up to 2kV/cm, and therefore, substantially high voltages are applied to the electrodes. Elementary rules of electrical safety require grounding one of the electrodes. Kim et al. disclose grounding a positive electrode (40 in Fig. 1) and alternatively grounding the negatively charged photoelectron emitter (20 in Fig. 2) through a wire (25 in Fig. 2, col. 4, lines 29 - 30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Fuji system by grounding one of the electrodes, particularly the photoelectron emitter because such grounding is necessary to ensure electrical safety of the device since it uses substantially high voltages.

As to some other elements of the Claim including thickness of the emitting layer these issues were addressed in Claim 1 rejection above.

Regarding Claim 26, Fiji discloses the light source generating an ultraviolet light (1 in Fig. 25).

Regarding Claim 27, Fuji discloses a structure including an ultraviolet lamp (1 in Fig. 25) surrounded by a mesh electrode (51 in Fig. 25) which is read on a mesh-shaped conductive member, which, in turn, is surrounded by a ceramic member 47 in Fig. 25) having a photocatalyst (in Fig. 25) 2 and a photoelectron emitter (45 in Fig. 25) attached thereto.

Regarding Claim 28, Fuji discloses the ventilator (Fan) (34 in Fig. 14) providing the air flow to the photoelectron generating device (6 – 2 in Fig. 23 and

Fig. 30) by using a fan, and the photoelectron generating member (45 in Fig. 23 – 26), according to Fuji, may have as a preferred shape a mesh (col. 20, lines 13 – 39).

Claims 2, 3, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuji in view of Aprile et al. (US 5,418,424). Regarding Claims 2, and 3 Aprile et al. disclose the photoelectron emitting layer (12 in Fig. 1) being deposited on the top of the stainless steel substrate, which is a conductive substrate (col. 2, lines 45 – 56). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Fuji structure by using the stainless steel as a substrate a material, because such selection makes possible using the substrate as one of the electrodes for providing an acceleration for the photoelectrons and directing their movement, i.e. drifting (col. 2, lines 5 – 24).

Response to Arguments

Applicant's arguments have been fully considered but they are not persuasive. Applicant attacks the Hirano reference for not disclosing a photoelectron emission layer (page 10). According to Applicant: "Since Hirano does not teach the claimed photoelectron emission layer thickness, Hirano could not have suggested modification of the photoelectron emission layer of Fuji to have the claimed photoelectron emission layer thickness".

However, as stated in Claim 1 rejection, the devices of Fuji and Hirano are similar in their structures. Both have an upper layer generating an emitting factor either light or photoelectrons and both are concerned with maximizing emitting ability of thin film emitting surfaces. Accordingly the same considerations regarding maximizing the emitting factors are applicable. Fuji selects the thickness of the emitting layer being larger than a roughness of the underlying layer. As stated in the Office Action, it would have been obvious by a way of analogy with teachings of Hirano to set a thickness of the photoelectron emitting layer in the Fuji device larger than the roughness of the underlying layer since, otherwise the photoelectron emitting layer would have too rough and non-contiguous surface which would eventually substantially reduce its ability to efficiently emit the photoelectrons, since as well known in the art, an ability of any emission layer to emit either light or electrons from its surface directly depends on the area of an emitting surface, i.e. the larger surface the stronger emission.

Therefore, the physical nature of emitting factor, light or photoelectrons, does not play a critical role as alleged by Applicant. Besides that, the Applicant criticism represents a clear case of attacking references individually. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

As to Hirano reference not providing suggestion to combine references together, this allegation rises to a level of a famous rigid interpretation of TSM requirements addressed by the Supreme Court in *KSR International Co. v.Teleflex Inc.* (KSR), 550 U.S. ___, 82 USPQ2d 1385 (2007). Specifically, the Supreme Court stated that the Federal Circuit had erred in four ways: (1) "by holding that courts and patent examiners should look only to the problem the patentee was trying to solve " (Id. at ___, 82 USPQ2d at 1397); (2) by assuming "that a person of ordinary skill attempting to solve a problem will be led only to those elements of prior art designed to solve the same problem" (Id.). In the instant case even though Hirano solves not exactly the same problem but quite similar problem (emitting light rather than emitting photoelectrons), does not mean that teachings of Hirano may not be combined with teachings of Fuji. Similarities between their concepts have been shown in Claim 1 rejection.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be

calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Jared Fureman can be reached on (571)-272-2391. The fax phone number for organization where this application or proceedings is assigned is (571) 273-8300 for all communications.

/Z. K./
Examiner, Art Unit 2836
5/7/2010

/Stephen W Jackson/
Primary Examiner, Art Unit 2836